

## Physics 341 Electronics Laboratory 10: Displays

AUTHORIZED RESOURCES: Any USAFA faculty member, your lab partner(s), any textbook or other published material, your data taken in lab\*, any computer software.

\* At your instructor's discretion, you may be allowed to use data from another source; however, such use must be approved in advance of the assignment due date.

*All material in your notebook is graded work! The neatness and organization of your notebook counts toward your grade.*

### **Pre-lab**

- Looking at the data sheet for the 74HC112 J-K flip-flop, what pin would you need to use, and what logic level would you need to apply to this pin, to bring all of the “Q” outputs to 0? Now, suppose that you have four bits representing a binary number. Design a circuit with logic gates that would reset all of your flip-flops to 0 when the binary number reaches 1010, equivalent to a decimal 10.
- Take a look at the data sheet for the 74LS47 BCD-to-seven-segment decoders/driver.

### **In the laboratory**

- Perform the tasks described in the following sections of your lab manual, recording your results in your lab notebook:

None required for this lab.

- Perform the additional following tasks, again using your lab notebook as your record:

Build the circuit that you designed in the pre-lab, using it to reset the counter on the board you built in the previous lab when the count reaches ten (binary 1010). Verify that it operates properly.

Using the data sheet for the 74LS47 chip, translate your binary counts to a seven-segment display.

### **For analysis**

- Answer the following additional questions in your laboratory notebook:

How would you modify your circuit to have it count to six and then reset?

Take another look at the decoder data sheet. How does it handle hexadecimal numbers? (“Hex” is the same as base 16.)